AMENDMENTS TO THE CLAIMS

Please amend claim 1, 6, 12, 18, 20, and 21, such that the status of the claims is as follows:

1. (Currently amended)A method for time synchronization of field devices on a network of a distributed control system, the method comprising:

transmitting periodically timing information from a master clock to the field devices over the network of the distributed control system; and

adjusting [[an]] a long-term output clock signal frequency and a time stamp of each field device as a function of the periodically transmitted timing information and an output clock signal local to each field device.

2. (Original) The method of claim 1 wherein the step of adjusting comprises:

calculating a frequency ratio based upon the periodically transmitted timing information and the output clock signal;

determining an add and a subtract parameter according to the frequency ratio; and

varying an output of a variable clock using the add and the subtract parameters to produce the output clock signal.

3. (Original) The method of claim 1 wherein a period between transmissions of the timing information varies.

4. (Original) The method of claim 1 wherein the step of adjusting comprises:

determining adjustment parameters;

generating the output clock signal with a nominal rate of one output pulse for every two input pulses of the fixed rate input clock signals; and

adding and subtracting pulses from the output clock signal based upon the adjustment parameters.

5. (Original) The method of claim 1 wherein the time stamp of each field device is synchronized to the master clock so that reading from the time stamp does not require time scaling in software.

6. (Currently amended) A method of synchronizing a local sense of time of each of a plurality of field devices to a clock of a master field device on a segment of a control network using a time distribution data unit, the method comprising:

detecting the time distribution data unit on the segment of the control network;

calculating a frequency ratio ~~between the local sense of time of a field device and a sense of time of the master field device~~ comprising a sense of time of the master field device divided by the local sense of time of a field device; and

adjusting as necessary the sense of time of the field device according to the frequency ratio.

7. (Original) The method of claim 6 further comprising:

testing the frequency ratio against boundary conditions of the field device.

8. (Original) The method of claim 6 wherein the step of adjusting comprises:

adding and subtracting variable pulses from a sequence of clock pulses generated by a variable clock based upon the frequency ratio.

9. (Original) The method of claim 6 wherein the sense of time of the field device is maintained by an output clock signal.

10. (Original) The method of claim 6 wherein a frequency ratio equal to one results in no adjustment to the sense of time of the field device.

11. (Original) The method of claim 6 further comprising:

time stamping subsequently received data packets in hardware without having to scale a local sense of time in software.

12. (Currently amended) A process control system having a common sense of time, the system comprising:

a control network;

a time master device in communication with the control network and having a master clock for generating a master clock signal, the time master device for periodically transmitting a time distribution data unit representative of the master clock signal; and

a plurality of time slave devices in communication with the control network, each time slave device having a local clock, and a time adjustment element for adjusting the local clock according to a frequency ratio ~~between~~ comprising the master clock signal ~~and~~ divided by an output clock signal of the local clock.

13. (Original) The process control system of claim 12 wherein the time adjustment element is implemented in software.

14. (Original) The process control system of claim 12 wherein the time adjustment element is implemented as a combination of hardware and software components.

15. (Original) The process control system of claim 12 wherein the local clock includes a fixed rate clock for providing input clock pulses and a variable clock for producing the output clock signal based upon the input clock pulses and adjustment inputs from the time adjustment element.

16. (Previously presented) The process control system of claim 15 wherein the time adjustment element calculates adjustment coefficients for use by the variable clock, and wherein the variable clock selectively adds and subtracts pulses from a sequence of pulses according to the adjustment coefficients.

17. (Original) The process control system of claim 15 wherein the output clock signal is substantially synchronized with the master clock signal.

18. (Currently amended) A method for reducing time processing cycles in distributed field devices of a process control network, the method comprising:

calculating adjustment coefficients for each field device according to a difference in frequencies between a local clock of each field device and a master clock of a time master device on the process control network; and

adjusting a ~~sense of time~~ long-term frequency of the local clock of each field device as needed to synchronize ~~a sense of time~~ the local clock of each field device with the master clock of the time master device.

19. (Original) The method of claim 18 further comprising:

transmitting a time distribution data unit from the time master to the distributed field devices before the step of calculating.

20. (Currently amended) The method of claim 18 wherein a time stamp of each field device is synchronized to the ~~sense of time~~ local clock of the field device such that reading a time value from the time stamp does not require scaling of the time value.

21. (Currently amended) The method of claim 18 wherein the step of calculating adjustment coefficients comprises:

calculating a frequency ratio between the local clock of each field device and the master clock of a time master device;

determining whether the frequency ratio is within adjustment boundary conditions; and

calculating the adjustment coefficients as needed for adjusting the frequency of the local clock.